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ABSTRACT

A study examined the effects of feedback on the job attitudes and behavior of female sewing machine operators. The control group design involved all 165 piecework operators at the experimental site (a garment factory in a large southwestern city) and a random sample of 54 operators selected from a sister plant of the same manufacturer 10 miles away. Pre- and posttests were administered one year apart. Treatment involved implementing several program elements: Variety in job assignments, task identity (grouping into subassembly teams), task significance (repairs became responsibility of team members), autonomy (supervisors would monitor work only between teams), and feedback (daily to each team on its quality levels as a group and by operation). While significant improvements occurred in the cohesion and goal commitment of operators in subassembly work teams, these improvements were especially likely to occur among long-term operators. Marked improvements in product quality were associated with feedback from management. Turnover and absenteeism also decreased, but overall satisfaction did not increase and intrinsic job satisfaction actually decreased. Operator work expectations increased as a result of their involvement in this field experiment. (Findings are discussed with reference to theoretical and practical issues in work systems redesign.) (Author/TA)

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EFFECTS OF FEEDBACK ON JOB ATTITUDES AND WORK BEHAVIOR: A FIELD EXPERIMENT

James L. Koch
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Technical Report No. 6

October 1976

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20. ABSTRACT (continued)

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ABSTRACT

This study examines the effects of feedback on the job attitudes and behavior of female sewing machine operators. While significant improvements occurred in the cohesion and goal commitment of operators in subassembly work teams, these improvements were especially likely to occur among long-term operators. Marked improvements in product quality were associated with feedback from management. Turnover and absenteeism also decreased, but overall satisfaction did not increase and intrinsic job satisfaction actually decreased. Operator work expectations increased as a result of their involvement in this field experiment. Findings are discussed with reference to theoretical and practical issues in work systems redesign.

EFFECTS OF FEEDBACK ON JOB ATTITUDES
AND WORK BEHAVIOR: A FIELD EXPERIMENT

Experiments in task and work system redesign have proliferated in revent years. By one account, the number of cases reported in the period 1970-1975 is equal to the entire number reported over the 20-year period 1950-1970 (Taylor, 1975). In general, these experiments have the following characteristics in common: (1) they are directed at a search for alternatives to task specialization, hierarchy and bureaucracy as the principle tenets of efficiency and control in work organizations; (2) they are directed at an effort to improve the relationship between individuals and their jobs or work organizations; and, (3) they emerge out of a recognition that traditional models of job and work system design have, in most instances, failed to meet both economic and social criteria of effectiveness (Davis and Cherns, 1975; Davis and Taylor, 1972; Ford, 1969; Maher, 1971; Lawler, 1969; Herzberg, Mausner and Snyderman, 1959). While many of these efforts have produced positive attitudinal and performance outcomes, their contribution to a cumulative body of theory is limited by methodological weaknesses.

If theory represents a partially verified statement of cause-effect relationships, then tests of theoretical models in this area should meet the following criteria: First, they should enable researchers and practitioners to generate hypotheses regarding the effects of specific

job design changes on individual attitudes and behavioral propensities. Second, they should enable us to identify those situational and individual variables which moderate the association between task design factors and individual responses. And, third, they should demonstrate predictive validity in field settings.

Examining each of these criteria, in turn, suggests areas of strength and weakness in current theory. First, there is no absence of conceptual models (Herzberg, Mausner and Snyderman, 1959; Davis and Taylor, 1972; Hackman and Oldham, 1975; Schwab and Cummings, 1976; Steers and Mowday, 1976). But, specific components of these models are seldom examined in ongoing work settings. Instead a diverse array of changes are frequently undertaken simultanously and in such a way as to preclude an assessment of how particular factors impact on employee responses (e.g., Walton, 1972). Second, a number of investigators have examined individual attributes which moderate responses to task design (Hackman and Lawler, 1971; Hulin and Blood, 1968; Wanous, 1974; Brief and Aldag, 1975; Koch and Morris, 1976). But, most of these studies merely report differences in the magnitude of survey-based correlational data and, for this reason, their external validity vis-a-vis field studies is suspect. Moreover, the mere reduction in magnitude of a correlation does not in itself undermine the utility of a particular field intervention. Finally, job design theory should enable us to predict employee responses to actual task or work system changes. It is in this area that our theory is weakest. The preponderance of empirical work to date is based on correlational assessments of point in time survey

data. As a result, we know clearly that perceptions of task attributes are related to attitudes and, in some instances, to behaviors such as turnover or performance (Lawler, 1969; Cummings, Molloy, and Glen, 1975, Koch and Steers, 1976). But we know little about how objective changes in specific job components affect work attitudes and behavior.

Research Objectives

The present research attempts to respond to the above criteria by examining the influence of actual task factor changes on cognitive variables (e.g., satisfaction, job challenge) in a field study employing a control group design. Psychological and behavioral reactions are thus examined as outcomes which can be associated with objective, rather than perceived, task characteristics (Schwab and Cummings, 1976). From a practical viewpoint this approach is especially useful since efforts to redesing work involve manipulation of actual tasks, rather than perceptions of these tasks.

The objective factor which was manipulated in this case was feedback, one of the dimensions identified by Hackman and Lawler (1971) and Hackman and Oldham (1976) as being of central importance in how people respond to jobs. According to these theoretical models, a job will produce desired psychological states (i.e., intrinsic motivation, satisfaction) only if it is high on all of the core dimensions (task significance, autonomy, feedback). Recent studies, however, have failed to support this argument (Hackman and Lawler, 1971; Brief and Aldag, 1975; Brief, Wallace, and Aldag, 1976). However, each of these studies employed perceptually-based measures of task

attributes and, for this reason, their findings may be confounded by common methods variance (Schwab and Cummings, 1976).

With regard to the feedback intervention described below two points should be kept in mind. First, feedback was given to operators as members of subassembly teams. These were nominal groupings based upon the sharing of common shop floor space and the interdependence of operations in determining overall garment quality. However, all individuals had assigned jobs and they did not conceive of their roles as encompassing a group task. Secondly, given the highly structured, routine and repetitive jobs it could be argued that operators were already receiving feedback from the task itself. However, this intervention (feedback from management) provided unique information (team and operation quality levels and cost variance information).

The literature on task-goal attributes is inconclusive with regard to the effects of knowledge of results, or feedback, on performance and affective employee responses (Steers and Porter, 1974). However, to the degree that feedback simultaneously increases goal specificity it has been consistently associated with improved performance. Factors accounting for attitudinal responses appear to be more complex, taking into account not only feedback and goal specificity but goal difficulty, acceptance, and individual valences (Steers and Porter, 1974). Moreover, from a practical job design perspective, feedback appears to be a relatively poor action lever in efforts to improve satisfaction. The core dimensions which seem to be most strongly linked to intrinsic motivation

and satisfaction are those associated with increased autonomy and responsibility (Cummings, Molloy, and Glen, 1975; Hackman and Oldham, 1975).

The purpose of the present study is to determine the effect of changes in feedback on performance and attitudes of shop floor employees. This specific job element was changed as an initial stage in the phase-in of a larger work system redesign effort directed toward the ultimate development of semi-autonomous work teams. Since the author was a participant observer in the plant site for a 14-month period, the theoretical interpretation of these data is augmented by clinical observations. These observations and the data presented will also assess the unintended consequences of undertaking change in an ongoing job, and the influence of changes in management styles on the organizational climate which formed the context of this job redesign effort.

METHOD

Research Setting

This research was conducted in a garment factory located in a large southwestern city. There are four primary classifications of employees in this factory: hourly cutting room employees; sewing machine operators on piecework; sewing machine mechanics; and, supervisors and training instructors. The focus of job design efforts was on the shop floor sewing operations.

Engaged in the manufacture of pants in a large batch operation, operators are arranged in a line flow system with work passing serially from one work operation to another. The assembly process is based upon a minute

subdivision of tasks with 34 operations involved in the total assembly and inspect process. Average cycle-time in these operations is about 30 seconds. At the time this field project began approximately 150 sewing machine operators were employed in the experimental site.

As is traditionally the case in this industry, their quality is checked by a full-time contingent of inspectors who conduct 100% inspections. Their inspection work is, in turn, checked on a sampling basis by independent auditors who report to a plant or regional quality assurance officer. A variable number of menders is on hand to mend sewing errors. Feedback to operators only occurs in extreme cases of negative performance. If an excessive number of errors is found in a 60-unit bundle due to work on a particular operation a bundle may be returned to the responsible operator for repairs.

On the shop floor operators work in large foom and report to supervisors who are responsible for daily production scheduling, monitoring quality, trouble shooting and reporting machine difficulties, and maintaining balance between operations. Their span of control varies from 30 to 50 operators and they are assisted by training instructors.

The garment industry is plagued by extremely high turnover rates, approaching 100% on an industry-wide basis. The experimental setting was experiencing about a 200% annual turnover rate at the time this experiment was initiated. Absenteeism was 9.4% on a daily basis.

The production process and the need to maintain a rapid and continuous pace to make incentive earnings results in operators feeling bound

to their positions in the room. Physical layout and normal production noise (about 70 decibels) restrict communication. As a result informal social groupings emerge primarily during breaks and tend to be based on age and length of service. In general, these observations corroborate those of Lupton (1963) in his study of factors affecting behavior on the shop floor of a sewing plant.

Subjects

The study involved all piecework operators at the experimental site and a random sample of 54 operators selected from a sister plant of the same manufacturer. This control group site was located approximately 10 miles from the experimental plant. Nearly all operators (95%) were female. The average operator had from 6 months to 1 year of tenure (a reflection of the high turnover rates). In this regard samples were bimodal, about 30 percent comprised of "long-term" operators with greater than 1 year of service; and, 50 percent with less than 6 months of service and tenuous attachment to the organization. The average operator was between 26 and 30 years of age and, as with education, there was no difference between the samples on this demographic variable. For purposes of the analysis reported here only those subjects who completed both pre- and post test instrument are included. This permits subjects in the experimental setting to serve as their own control group, thus augmenting the sister plant control group. A large portion of the operators in both settings (about 65%) were Hispanic and 78% had completed high school.

Data Collection

A lengthy questionnaire was completed by nearly all operators (94 percent) in the experimental setting approximately 1-month before initial planning began for the subsequent job redesign efforts. Those who objected to completing this survey, and those who could not complete the survey at the site due to language difficulties, were not pressured to participate. Surveys were administered in the plant cafeteria of both the experimental- and control group sites. Pre-measurements were taken in October 1974 and post-measurements were taken approximately one-year later (November 1975).

In addition to perceptual and attitudinal survey data, benchmark and post-intervention data were gathered on absenteeism, turnover, and product quality. To smooth out month-to-month distortions in absenteeism and turnover a 6-month benchmark average was compared with the same 6-month post-intervention period. Any improvement factor reported here cannot be attributed to general economic conditions as local unemployment declined slightly between pre-and post intervention periods (i.e., if turnover and absenteeism declined it was not due to greater difficulty in seeking alternative jobs). Benchmark data on quality (seconds) are reported for the 9-month period preceding the intervention to smooth out the effect of excessively high seconds rates immediately preceding the intervention.

Perceptual and attitudinal benchmark data had to be established at a very early stage because operator elected representatives subsequently became involved in planning all of the interventions described below.

The actual changes reported here were not undertaken until 7-months after the pre-test. Identical questionnaires were administered in the control group setting at times coinciding with the experimental site surveys. Results were not reported to operators.

Because of the turnover problem only 57 of the 165 operators in the experimental setting completed both the pre- and post tests, and 21 of 54 operators in the control group setting were on hand one year later.

Intervention

An elected Adivsory Board comprised of operators, the personnel manager, plant manager and the investigator was established about one week after the pretest. This group served as a sounding board for operator views of various job and work system redesign concepts throughout the period covered by this study. This new role was an extremely ambiguous one to operators and the initial weekly meetings encountered a large amount of inertia.

The early weeks of this group's functioning, however, did bring agreement regarding the objectives which were to guide this organizational change program. During this time operators expressed the greatest concern about physical conditions in the plant (the repair of air conditioning units, restroom cleanliness, cafeteria food, and the absence of an open air eating area). As a result of these meetings the following actions were taken over the course of the time period covered by this study. All air conditioning units were overhauled, restrooms were completely remodeled with all new fixtures, a hot food installation was purchased for the

cafeteria, and a covered patio was added adjacent to the cafeteria. These physical changes helped to establish the legitimacy of the Advisory Board, but they did not fully resolve ambiguity regarding the appropriate role and functioning of this group.[1]

Beyond these physical changes Advisory Board members expressed a very strong interest in the manufacturing costs of pants. This interest emerged out of the plant manager's expression of concern regarding poor plant efficiency (excessive variances from standard costs) and the plant's reputation for poor quality. At this time the plant was considered by the company to be one of the three least effective plants out of 60 installations.

The first shop floor intervention involved 12 operators in a section of the plant which was geographically separated from the larger sewing floor. Most of these operators were "long-timers" (greater than 1-year of tenure). Many were cross-trained on two or more of 10 operations. For a period of 3 months they functioned as an autonomous group without supervision. Their responsibilities included all the normal supervisory roles (trouble shooting machine problems and reporting them for mechanical service, scheduling, line balance, taking production, reporting attendance, and granting guaranteed earnings time to operators transferred to jobs other than their primary sewing operation). On a daily basis elected representatives received feedback on the team costs. Results of this

[1] It might be argued that these hygiene changes are a potentially contaminating manipulation which provide an alternative explanation for results. If this were the case, however, we would expect an overall upward bias in affective response patterns (overall satisfaction, organization climate). As Table 1, 2 and 4 indicate, this did not occur.

experiment were promising and received broad publicity throughout the company. But the remainder of the plant was bogged down with very serious operating difficulties. Since this section relied on the ability of those next in the line to accommodate their added efficiency, they were soon forced to take time off to avoid overstocking the sewing floor with work in process. This seriously damaged the morale of the group, as did the jealousy of other operators and grudging concern of some supervisors who felt these operators were prima donas.

The plant manager's resignation (4 months after the pretest) and an appointment of a new plant manager brought a new set of priorities to the experimental site. Shortly after arriving the new plant manager halted this pilot experiment and directed the plant's full energies to resolving very serious production problems. During the next four months the Advisory Board became unsettled regarding its role and legitimacy. As pressure mounted to resolve immediate production problems it became increasingly a conduit for operator complaints. The plant manager was quick to respond to these complaints, but he was under growing home office pressure to resolve a broad webb of plant problems. Increasingly, the work system redesign efforts were described as "on a back burner".

The investigator's focus during this four month period shifted to longer term developmental planning and refining an integrated model for semi-autonomous team functioning in all subassembly sections. Advisory Board members served in a consultative mode regarding program elements, but their enthusiasm and interests were dampened somewhat by knowing there would be lengthy delays before each of the following program elements were implemented:

Variety: All trained operators would be eligible to learn additional skills. With each additional operation learned they would receive a pay increase. They would also be eligible to become certified as a mechanic's aide which would permit them to repair nearly 80% of their own machine breakdowns. Again, this skill would be rewarded with a base rate increase.

Task Identity: Operators would be grouped into subassembly teams with boundaries determined by the amount of functional interdependence between operations, natural geographic factors, and the feasibility of work-in-process banks.

Task Significance: End-of-line inspectors would be dispersed at natural points throughout the line, and all repairs would be the responsibility of team members. There would be no menders. Bonus rewards would be paid under a modified Scanlon plan for cost variance reductions.

Autonomy: Supervisors would monitor work flows between teams, and ultimately have responsibility for only exceptional problems arising within a semi-autonomous group. The initial pilot program strongly supported the feasibility of this shift in supervisory roles. Scheduling, hiring and training (beyond the vestibule stage) would be the responsibility of team members.

Feedback: On a daily basis each team would receive feedback on its quality levels as a group and by operation. Cost variances would be reported on a weekly basis to all team members, and reductions below an established standard would be accumulated each week. These would be

paid as a bonus on a quarterly basis. If bonus earnings accrued in one week, but excesses occurred the following week the accumulated bonus would not be diminished. This potential form of positive reinforcement was not realized over the period covered by this study due to imbalanced staffing patterns within subassembly groups.

Plant operating conditions and the obvious priority of remedying these problems prevented implementation of any portion of this model until nearly seven months after the pretest. However, by this stage it was in a very refined form and had the enthusiastic support of plant management and top level executives including the highest level corporate engineer.

By this time work flow obstacles permitted implementation of only the feedback component. Colorful, large display boards were specially constructed for displaying feedback to each of five subassembly groups as called for in the proposal. Unfortunately, the bewildering array of in-line production problems had by this stage brought about the plant manager's resignation.

His successor agreed to continue full use of these feedback boards, but addressed his primary energy to problems of line balance, cutting room scheduling, and the poor repair of machinery. With this combination of efforts he hoped to improve production attainment from its low level of 50%. He did, however, give his full support to the feedback system. For four months prior to the post test and throughout the time following the post test this has been a fully functioning part of operations in the experimental site.

Research Questionnaire

The questionnaire given to operators was a shortened version of the Survey of Organizations Instrument (Taylor and Bowers, 1972). Other scales were added as indicated below.

Survey of Organizations Scales:

1. Organizational Climate--a shortened version was adopted which includes 5 subscales (Human Resources Primacy, Communication Flow, Decision Making Practices, Technical Readiness, and Lower Level Influence).
2. Managerial/Supervisory Leadership--a factor assessing four components of effective leadership (Support, Interaction Facilitation, Goal Emphasis, Work Facilitation).
3. Peer Leadership--a factor assessing peer leadership effectiveness within subassembly groups (Support, Interaction Facilitation, Goal Emphasis, Work Facilitation).
4. Group Process--the effectiveness with which subassembly groups coordinate their work toward objectives and solve problems.
5. Satisfaction--a scale comprised of items indicating levels of satisfaction with rewards, supervision, the organization, fellow employees, the job, and present and future progress within the company.
6. Higher Level Need Fulfillment.
7. Job Challenge.

Other Scales:

1. Higher Order Need Strength. Items adapted from Hackman and Lawler (1971). Not discussed in this paper.
2. Incidents of Psychosomatic Illness. Adapted from Turner and Lawrence (1965).
3. Perceived Organizational Effectiveness. A survey of organizations scale comprised of 3 items.
4. Job Descriptive Index.
   - Satisfaction with work.
   - Satisfaction with pay.

   Both adjective check lists (Smith, Kendall, and Hulin, 1969).
5. Biographical Information including age, education, socio-economic status, and length of service.

In addition to operators at the experimental site, questionnaires were completed by all hourly personnel including supervisors, instructors, mechanics, cutting room workers, material handlers, and office staff.

RESULTS AND DISCUSSION

Effects of Feedback Changes on Perceived Organizational Characteristics

Mean ratings of organizational characteristics as perceived by operators before and after the changes described above are reported in Table 1. Control group subjects are included to test for temporal differences which may not be attributable to interventions. These data show that feedback of product quality and cost variance information to subassembly

groups had a significant positive effect on peer leadership. There was improvement on all four scales. The change on interaction facilitation ($p < .01$) suggests that there were significant increases in peer behavior which encouraged shop floor operators to develop close, cooperative working relationships with one another. The change in goal emphasis ($p < .05$) indicates an increase in mutually contagious enthusiasm for doing a good job.

Insert Table 1 About Here

Group processes also improved within subassembly teams. All of the items in this 7-item scale increased, three of them significantly. Operators were more likely to indicate that their peers wanted to meet objectives ($p < .05$); they viewed their work group as more adaptable when unusual work demands were placed upon it ($p < .001$) ; and, they had more confidence and trust in persons in their work group ($p < .01$). All in all, peer group functioning improved markedly over the period of this study. However, it should be pointed out that initial conditions indicated an extremely negative starting position, a factor corroborated by depth interviews and first hand observation of plant morale. Were it not for the specific nature of the intervention, these results might be explained as arising out of regression toward the mean.

The only other significant changes indicated by this broad set of measures concern two aspects of organizational climate. Clinical observations suggest that both of these negative changes can be attributed to unmet expectations. Operators were much less likely to feel that the organization was quick to use improved work methods ($p < .05$). In part, this

response seems to have been associated with operator frustration over lengthy delays in efforts to implement a full-blown semi-autonomous group program. Over 80% of the eligible operators had indicated a desire to seek multi-skill status 8 months prior to the post-test, but none had begun their cross-training.

The communication flow scale indicates that supervisors were somewhat less likely to ask group members for their ideas and opinions before making a decision ($p < .01$), and they were less likely to meet with their subordinates as a group ($p < .01$). Unmet expectations, again, may account for these differences. Clearly, the events of the year led operators to expect more involvement than they had been accustomed to. It should also be noted that both the technology of the industry and the "new" plant manager's own decision making style were not conducive to consensual decision making (see Table 5).

Differential Effects of Changes for Long- and Short-Term Operators

Operators were divided as close to the median tenure as possible to examine the differential effects of interventions on how they experienced their work environment from both a perceptual and attitudinal perspective. This analysis was conducted for several clinically based reasons: First, long-term operators had been more influential in developing experimental plans (e.g., all advisory board members came from this group). Second, it was expected that peer leadership would be more likely to emerge among these individuals. Since the technology limits shop floor communication most informal groups were comprised of individuals with

similar lengths service and common break times. Hence, long-term operators were more likely to have developed some degree of cohesion, a factor which enhances the rate of adaptation in a context where group norms and attitudes are changing (Argyle, 1972).

Insert Table 2 About Here

The results in Table 2 clearly indicate that peer leadership was more likely to emerge among long-time operators. In addition to improved patterns of task interaction and a stronger goal emphasis, these individuals were more likely to find personal support among their peers. On the work facilitation scale, they felt that their peers offered more help in finding ways to do a better job ($p < .10$); in assisting in planning, organizing, and scheduling work ($p < .01$); and, in offering new ideas for solving job related problems ($p < .10$). They experienced a significant improvement in overall group processses ($p < .01$), while short-term operators did not.

These findings are corroborated by clinically-based observations. Perhaps the most significant factor accounting for these differences is the marked instability of the short-term peer group. Only 22 percent of those originally classified as short-term employees were still employed at the time of the post-test, compared with 62 percent of the long term group.

Taking these differences in group processes and peer leadership into account, we would expect to find differences in affective operator responses (Likert, 1967). As Table 2 indicates, this is the case.

Job-related attitudes declined significantly for the short-term operators, but only nominally for long-term operators. Taken together, the nature of the intervention, temporal aspects of work attitudes, and site observations suggest tenable explanations for this pattern.

Both Table 2 and 4 suggest that there is a natural proclivity for operators to experience reduced job challenge over time. By the time an operator has been on the job for four months, her learning curve is virtually flat. There is relatively little she can do to continue to improve job competencies beyond this early stage, and opportunities for promotion are generally blocked by a high degree of employment stability among supervisory staff. Despite this factor, there is a countervailing tendency for individuals in all jobs to express greater satisfaction with increasing tenure (Ivancevich and Donnelly, 1968). Thus, in both samples there was a marked decrease in job challenge but no significant decline in overall satisfaction (Table 4).

The nominal grouping of operators into subassembly teams and the use of regular feedback clearly seems to have enhanced the social and task-related interactions of long-term operators. While this would normally be expected to improve work attitudes (Likert, 1967) it appears, instead, to have increased resilience with regard to natural tendencies to experience reduced challenge and interest in shop floor tasks. Overall satisfaction remained about the same, but attitudes associated with intrinsic satisfaction declined. Clearly, feedback on quality and cost variance data alone is insufficient to improve work attitudes and well being.

There is, at best, a weak indication that increased identification with sub-assembly groups will arrest the tendency to experience greater job-attributed illness (psychosomatic illness, Table 2) with increased tenure.

The Effect of Feedback on Work Behavior

Table 3 presents data for turnover, absenteeism and quality levels in the experimental site. These data appear to substantiate the practical utility of the interventions but, again, site observations suggest a more complex pattern of causality.

Insert Table 3 About Here

To smooth out monthly fluctuations and present a representative base-line/post-intervention perspective on absenteeism and turnover 6 month averages are presented. The most startling fact here is that initial conditions were characterized by turnover at annual rate of 216 percent and nearly 1 in 10 operators absent on any given work day. At the site, it really appeared as though people were just passing through (more like a roadside lodge than an on-going manufacturing facility). Thirty-three operators had to be hired to get one who would stay for a full year.

Under these conditions balancing the production line was, perhaps a possibility for a theoretical mathematician. But for mortal supervisors and plant managers it was a nightmare. Top-level corporate officers (many of whom have risen through the plant management ranks) relate to a temporal frame of reference when the labor market was immensely more stable.

They are not fully emphatetic to the difficulty that this degree of instability presents, and this greatly increases the felt pressure of plant managers.

Given these conditions, most plant managers adopt the strategy of building buffers in "headcount" across most operations. It is a strategy which insures relatively high production attainment, but one which also causes sporadic layoffs due to line imbalances (about 5%). This creates an ironic twist in the reward system as individuals on operations with high attainment are rewarded with sporadic layoffs. Since most workers would rather have predictable total earnings than maximum hourly income (Lawler, 1974), this creates an incentive to "make work last".

The changes which occurred in rates of turnover and absenteeism during this period merely brought the experimental plant into line with the control group setting (average monthly turnover about 12 percent, average absenteeism about 7 percent). Since work attitudes tend to be associated with turnover and absenteeism (Porter and Steers, 1973), the attitudinal data in Tables 2 and 4 would fail to support even this degree of improvement.

From a theoretical perspective these improvements can be explained with reference to expectancy theory (Vroom, 1964). The relationship of sewing operators to their job is largely instrumental, i.e., it is a means of providing necessary family income. Two out of three came from families with a total annual income of less than $8,000 (according to Labor Department Statistics an urban family of four required, at the time of this study, a minimum income of $8,500). Many were single parents or sole

providers. By improving plant efficiency (line balance, machine repair, cutting room quality) and openly assuring all operators of no layoffs, the plant manager who began in June 1975 greatly improved the job attachment of operators. Both the expectancy of effort leading to performance and the expectancy of that performance not being associated with the adverse consequence of layoffs were improved. From an economic perspective it was a "better" place to work... at least on a par with the sister plant across town. Between May 1975 and October 1975 production attainment rose from 48 percent to 90 percent and since December 1975 it has stabilized at about 100 percent. Thus, turnover and absenteeism improvements must be attributed to management initiatives, and not experimental interventions. The quality improvements, however, can be directly attributed to the feedback intervention.

Sewing quality on the shop floor is not easily accessible to management control. It is a worker selected criterion and, it is subject almost exclusively to the operator's judgment. End-of-line inspectors are geographically removed from operators and, prior to the feedback intervention, the only feedback an operator received was sporadic and unfocused. Accordingly, when work was returned to the line it was met with a feeling of inequity (why me?) or scapegoating ("I did it this way because of the way the work came to me").

As Schwab and Cummings (1976) indicate expectancy perceptions are partly determined by "the specificity with which task performance can be defined and the extent to which the individual can control his/her own performance"

(p.28). Increasing the clarity of feedback and the specificity of goals (prior to this operators were merely expected to do their best) served to provide operator efforts a clear focus. At the site the author was, on several occasions, taken aside by operators who pointed to the quality level of their operation on a large plexiglass graph. Among many there seemed to be a benign spirit of competition to improve over the percentages of other operations, and nearly all seemed concerned if their quality level moved outside of a color-coded "good" area. These results are consistent with a large literature linking increasing specificity of task goals to increased employee effort (for a review of this literature see Steers and Porter, 1974).

As the literature suggests, however, feedback and goal specificity alone cannot be expected to improve work attitudes (Steers and Porter, 1974). This is largely a function of the amount of participation in goal setting (standards for "good", "average", and "poor" were set by management in this case) and the work itself (responsibility/autonomy task components were unchanged). It is interesting to note, however, that the results of this field intervention are consistent with a laboratory experiment in which specific goals were positively associated with goal commitment, increased work-group cohesiveness, and greater task interest (Raven and Rietsema, 1957).

Quality improvements trends in the experimental site coincided precisely with the time at which feedback of progress toward specific goals was instituted. The amount of improvement in this area cannot be

attributed to other factors There was no change in supervision and the plant manager focused his energies almost exclusively on production attainment and cost variances. These improvements are all the more remarkable when it is noted that over the period from May to October, 1975 production attainment climbed from 48 to 90 percent. Moreover, these results have been sustained over the first two quarters of 1976 (average monthly seconds .9 percent). The plant is now reputed to have the best quality level of any plant making a comparable product (about 40 plants).

As many plant managers have indicated to the author, "you can't inspect quality into the garment". It is an operator controlled criterion.

Effect of Changes on Operator Attitudes

Table 4 indicates that operator attitudes tended to decline over the course of this study in both the experimental site and the control group setting. As indicated above, there appears to be a built-in proclivity for shop floor operators to experience less job challenge and satisfaction with the work itself as their length of employment increases. In fact, the need to sustain a rapid and continuous pace to maintain incentive earnings seems to be associated with more work-attributed headaches and nervousness.

Insert Table 4 About Here

About one month prior to the post-test a wage increase of nearly 10 percent was granted. The effect of this increase is reflected in improved

pay satisfaction in the control group, but not the experimental site. These results can be explained within an equity framework. In the wage and effort bargain experimental operators perceived themselves as contributing much more to their jobs (higher quality and increased plant attainment). However, added bonus earnings had not been triggered under the bonus plan because of the high standards initially established. Thus, while they received positive feedback with regard to quality improvements on a daily basis, their weekly feedback on variance costs failed to result in bonus earnings. Their new awareness of variance cost data consistently came in the form of negative (not punitive) feedback. While in an absolute sense the plant was markedly more effective than a year earlier, operators had information they hadn't known about back then and they perceived their organization as less effective ($p < .01$). They had benefited economically through reduced layoffs, but they had not benefited psychologically from improved operating effectiveness.

Differences between experimental site data in Table 4 and that presented in Table 2 can be explained from an expectancy perspective. For long-term operators the goals which were set were more likely to be perceived as attainable. Short-term operators were, in many instances, still struggling to achieve consistent quality while maintaining their production standards. Moreover, as has been found elsewhere, the nature of the work itself is the principle determinant of female work attitudes on the shop floor (Wild, 1969; Lupton, 1963, Marrow, 1967).

Managerial Succession and Peer Leadership Among Supervisors

Table 5 presents what is largely an exploratory analysis of the effects of two changes in plant management over the one year covered by this study. Two things are evident from this table: the new manager was much less concerned with supervisory interactions than results; and, collaborative forms of peer leadership among supervisors decreased markedly.

Insert Table 5 About Here

According to one popular theory of organizational behavior, the decline in supervisory peer leadership indicated in Table 5 should have a deliterious effect on peer leadership among operators (Likert, 1967). This does not appear to have been the case (see Table 1). However, it is possible that this shift in management styles had a dampening effect on the development of shop floor peer leadership.

Within the context of a sewing operation peer leadership styles are readily transmitted between plant management and supervisors through weekly and sometimes daily meetings. They are less readily transmitted between supervisors and groups of operators. Task-related communications between supervisors and operators tend to be strained (a police and enforce ethos is not uncommon), and the broad span of control limits easy-going social interactions. Communications are almost exclusively one on one, and group meetings are seldom if ever held. Group feedback sessions were generally conducted by the plant manager or workforce development officer (the author).

For these reasons, the linking pin theory (Likert, 1967) which suggests that leadership styles will be transmitted downward through each link of the hierarchy may not be applicable at the shop floor level.

Based on clinical observations the adverse shift in peer leadership among supervisors reflects role ambiguity arising out of serving under three different managers over the course of this one year period. It also reflects a more task-oriented manager. One concerned more with results and individual accountability among his supervisory staff than camaraderie or participative decision making. From a contingency perspective (i.e., given the existing technology, structure and process) this may make sense. However, if an alternative organizational climate is desired (Table 1), if turnover and absenteeism are to be further reduced (Table 3), and if the quality of working life is to be improved (Table 4), some degree of accommodation will have to occur. Given the strong Hispanic cultural influence (respect for "strong" leadership) and the contingent production environment, it may be more appropriate to focus on training group members in autonomous team functioning than training a plant manager in participative decision making.

Effect of Experimental Status on Operator Norms and Expectations

Table 6 reflects a spillover effect, or what some organizational development practitioners would call an unintended consequence. Operator norms about appropriate leadership behavior both among supervisors and work peers increased across the board in the experimental site.

Insert Table 6 About Here

These data are both a plus and a minus. They suggest greater personal identification with work-related interactions and greater commitment and attachment to the organization and its goals; but, they also indicate a greater propensity to experience unmet expectations, or the feeling of being "let down" by the organization. In the overall satisfaction scale, only two items registered marked declines: operators were significantly less satisfied "with the progress they had made up to now" ($p < .001$); and they were less optimistic about their chance to get ahead in the future ($p < .001$).

At least one theorist has raised important questions regarding the use of satisfaction and related attitudes or criteria for assessing the quality of working life. (See Stanley E. Seashore, "Defining and Measuring the Quality of Working Life," in Davis & Cherns (eds.) 1975). Perhaps future studies should more fully examine work norms and expectations as indicators of individual investments and identification with work roles.

CONCLUSIONS

This field experiment corroborates the results of studies which have shown a positive effect of feedback on performance (Braunstein, Klein, and Pacla, 1973; Hundal, 1969; Smith and Knight, 1959; Weita, Antoinetti, and Wallace, 1954; Kim and Hamner, 1976; Latham and Yukl, 1976). The quality improvement results reported here have now been sustained for over

one year. However, these results are also consistent with recent field experiments which indicate no favorable effect of feedback on job related attitudes (Kim and Hamner, 1976; Latham and Yukl, 1976).

Since this field intervention was undertaken as an initial step in a broader effort to improve the quality of working life, these results point to the limited efficacy of knowledge of results alone. In this regard, they raise serious questions about compensatory and disjunctive models of job enrichment which suggest that an improvement of any single task component will have favorable attitudinal effects (Brief, Wallace and Aldag, 1976). Because these results are based on the manipulation of an actual task attribute they are not subject to the common methods error which is a part of perceptually-based correlational studies.

Throughout the period covered by this study the variety, task identity, task significance and autonomy job components remained unchanged. It appears that these and/or related work system variables are crucial if the quality of working life is to be enhanced satisfactorily. In the vernacular of socio-technical thinking, feedback appears to have particular value as a technical/economic intervention, but rather limited utility as a social/psychological intervention to improve attitudes. Accordingly, it is appropriate that experimentation in this project site is continuing. Since the post-test it has progressed in the following ways: (1) all operators can now determine their own starting and quitting times within a flexitime program; (2) the original semi-autonomous pilot group is once again in operation; and (3) a "mini-line" model is being implemented which

comprises a small group of cross-trained operators completing all assembly work and rewarded by a modified Scanlon Plan. Participation in each of these experiments is voluntary.

Looking back over the 14 months which the author spent on the shop floor suggests some important recommendations to practitioners. Not the least of these is the observation that satisfactory and enduring change takes a considerable amount of time. Expectations (from the shop floor to the executive suite) tend to be out-of-line with what can reasonably be achieved within, say, two or three years in an on-going facility. At the shop floor level this increases the propensity to experience unmet expectations.

Job or work system redesign is not like "happy gas". There are no instant or near-term results of a broad-gauge nature. State-of-the-art technology and the organizational climate of manufacturing processes present onerous obstacles. Whether these can be sufficiently altered to substantively improve the quality of working life remains to be demonstrated. Semi-autonomous group concepts provide one promising avenue for enlarging the significance and meaning of work on the sewing floor, especially if these concepts are coupled with feedback and equitable rewards.

From a practical viewpoint, feedback appears to have been an especially useful initial stage in this on-going experiment. In this case it has enabled operators to see more precisely what is expected of them, and it has stimulated a greater emphasis on goal achievement. This impact

was especially likely to occur to more senior operators, a finding which is consistent with the body of literature which indicates that organizational commitment is associated with tenure (Steers, 1976). Their greater initial commitment, coupled with their greater ability, increased their propensities to both accept and achieve target goals.

From a broader societal perspective the author's clinical observations on the shop floor are relatively consistent with the conclusions of Seashore and Barnowe (1971) regarding the lot of the "Matriarch" (female, and a major wage earner for a household with one or more dependents). He described this group as one of two groups with an especially high propensity to experience generalized dissatisfaction with life, alienation from society and social roles, blunted aspirations, aggressive feelings toward other kinds of people, a low sense of political efficacy, mild paranoiac reactions, and mild but debilitating health reactions. This is not to suggest a pervasive norm of hopelesness, nor an absence of laughter or spontaneity. In fact, the author's observations suggest that two groups may be especially resilient vis-a-vis these propensities; Hispanics identified with a communally-based ethnic subculture, and women identified with extended families.

Clearly, the quality of working life is a highly complex and interdependent issue. It must focus on myriads of factors within organizations, and yet its causal texture extends beyond the boundaries of the workplace. Limited interventions such as the ones described herein can help to test and refine theoretical models, but they are insufficient as "solutions" to

such a broadly based issue. Perhaps the next increments in this experimental site and others will add further to our store of social learning in ongoing work operations.

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Footnotes

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Table 1

Perceived Organization Climate, Supervisory Style, Peer Leadership and Group Processes

Characteristic	Experimental Group (n=57)				Control Group (n=21)			
	Before		After		Before		After	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Climate								
Human Resources Primacy	8.66	2.32	8.12	2.38	9.79	2.16	9.31	2.51
Decision Making Practices	9.78	3.14	9.85	2.87	11.29	3.53	10.29	3.33
Technical Readiness	5.93	1.75	5.39[a]	1.67	5.81	1.25	6.14	1.56
Lower Level Influence	8.46	2.23	8.67	2.56	9.00	2.15	8.81	2.82
Communication Flow	7.85	3.23	6.67[a]	2.77	7.86	3.23	7.86	2.80
Supervision								
Support	11.28	2.84	11.82	3.01	10.62	2.82	9.76	2.64
Interaction Facilitation	5.14	2.39	5.35	2.15	4.67	2.22	5.43	2.25
Goal Emphasis	7.93	1.79	7.51	1.89	7.38	1.83	7.00	2.12
Work Facilitation	9.35	3.58	8.95	3.93	8.52	2.66	9.14	3.21
Peers								
Support	10.49	2.88	11.03	2.96	11.62	2.65	10.29[a]	2.53
Interaction Facilitation	6.42	3.00	7.44[c]	3.11	9.24	3.46	8.71	2.87
Goal Emphasis	5.70	1.90	6.18[b]	1.90	7.29	1.55	6.81	1.60
Work Facilitation	7.12	2.90	7.71	3.24	9.62	3.65	8.33[a]	2.97
Group Processes	19.75	5.33	21.60[c]	5.58	24.24	5.43	23.90	4.35

[a] $p < .05$, two-tail t-test of significance used because direction is not advanced.

[b] $p < .05$, one-tail t-test of significance used because direction is propositionally derived from previous research on goal setting and feedback within a group context.

[c] $p < .01$, one-tail t-test of significance used because direction is propositionally derived from previous research on goal setting and feedback within a group context.

Table 2

Comparison of Responses For Long Term and Short Term Groups

Characteristic	Experimental Site				Control Group	
	Less than 1 Yr. (n=26)		More than 1 Yr. (n=31)		More than 1 Yr. (n=16)	
	Before	After	Before	After	Before	After
Climate						
Human Resources Primacy	9.06	8.31	8.32	7.97	9.41	9.41
Decision Making Practices	10.24	9.50	9.39	10.14	10.38	10.31
Technical Readiness	6.19	5.46	5.71	5.32	5.81	6.25
Lower Level Influence	8.15	8.19	8.71	9.06	9.19	9.50
Communcation Flow	7.62	6.81	8.05	6.55*	7.81	8.31
Supervision						
Support	11.08	12.00	11.45	11.66	9.88	9.88
Interaction Facilitation	5.19	5.23	5.10	5.45	4.63	5.69*
Goal Emphasis	7.61	7.12	8.19	7.84	7.06	7.25
Work Facilitation	9.50	8.77	9.23	9.10	8.69	9.56
Peers						
Support	10.69	10.06	10.32	11.84*	11.69	11.06
Interaction Facilitation	6.46	7.15	6.39	7.68*	10.06	8.63
Goal Emphasis	5.62	5.50	5.77	6.77*	7.50	7.25
Work Facilitation	7.65	7.38	6.68	7.98*	10.44	9.19
Group Processes	19.60	20.27	19.87	22.72**	25.31	24.81
Overall Satisfaction	26.54	24.73	26.29	25.85	27.05	27.63
Higher Level Need Fulfillment	17.47	15.62**	17.61	16.65	17.44	17.22
Job Challenge	9.52	8.35*	9.24	8.10	9.69	8.75
Psychosomatic Illness	8.08	8.73*	9.13	8.90	8.56	9.06
Perceived Org. Effectiveness	8.50	7.25*	8.32	7.61	9.31	9.19

* Difference between before and after groups significant at $p < .05$ (two-tailed test).
** Difference between before and after groups significant at $p < .01$ (two-tailed test).

Note: For the control group only more than 1-year subjects were included for purposes of comparison with more than 1-year subjects in the experimental site.

Table 3

Changes in Work-Related Behaviors: Comparison of Base-Line Data With Post-Intervention Data

1. Turnover: Average Monthly Turnover	
Base-Line: May-October 1974	18.0%
Post-Intervention: May-October 1975	11.3%
Percent Decrease = 37%	
2. Absence: Average Daily Absence	
Base-Line: May-October 1974	9.4%
Post-Intervention: May-October 1975	6.7%
Percent Decrease = 29%	
3. Quality: Average Monthly Seconds Due to Sewing	
Base-Line: July 1974 - May 1975	2.9%
Post-Intervention: June 1975-October 1975	1.0%
Percent Decrease = 66%	

Note: Throughout the period covered by this study the control group setting experienced relatively steady monthly turnover of about 12 percent and absenteeism of 6 to 7 percent. Seconds averaged about 2 percent.

Table 4

Affective Responses for Experimental and Control Groups

Affective Responses	Experimental Group (n=57)				Control Group (n=21)			
	Before		After		Before		After	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Overall Satisfaction	26.40	4.46	25.34	5.45	26.85	4.02	25.67	5.60
Higher-Order Need Fulfillment	17.55	3.08	16.18*	4.09	17.52	3.47	15.60	4.79
Job Challenge	9.37	3.00	8.21**	3.78	9.62	2.85	7.81*	2.94
Work Satisfaction (JDI)	26.93	9.68	23.54**	9.89	27.38	8.54	26.00	8.52
Pay Satisfaction (JDI)	13.75	5.97	12.96	6.08	11.81	6.10	15.05**	5.73
Psychosomatic Illness	8.65	1.55	8.82	6.63	8.33	1.56	9.38*	2.09
Perceived Org. Effectiveness	8.40	2.34	7.45**	2.11	9.67	2.39	9.29	2.24

* $p < .05$, two-tail test.

** $p < .01$, two-tail test.

Table 5

Managerial Succession at Experimental Site: Changes in Management Style And Its Influence on Supervisory Leadership Behavior and Attitudes

Characteristic	Supervisor Responses (n=8)			
	Before Intervention		After Intervention	
	Mean	S.D.	Mean	S.D.
Plant Management				
Support	8.75	3.77	9.75	2.87
Interaction Facilitation	6.13	1.96	4.75*	1.39
Goal Emphasis	5.38	2.20	6.50*	1.07
Work Facilitation	8.25	3.69	9.13	2.70
Supervisors				
Support	10.13	2.36	9.13	1.64
Interaction Facilitation	9.50	2.62	7.25*	1.49
Goal Emphasis	6.38	1.77	5.25*	.89
Work Facilitation	9.63	2.93	6.25**	1.67
Attitudes				
Overall Satisfaction	26.00	2.82	26.79	2.87
Higher Level Need Fulfillment	18.86	3.00	17.63	3.62
Job Challenge	10.63	2.83	11.38	3.02

* $p < .05$, two-tail.

** $p < .01$, two-tail.

Table 6

Workplace Expectations
Regarding Appropriate Behavior

Expectations	Experimental Group n=57			Control Group n=21		
	Pre	Post	Δ	Pre	Post	Δ
Re. Supervision						
Support	13.52	13.79	+	13.48	12.48**	-
Interaction Facilitation	8.14	8.51**	+	8.86	8.43	-
Goal Emphasis	9.09	9.04	-	8.95	8.24**	-
Work Facilitation	13.05	13.16	+	13.81	13.10	-
Re. Peers						
Support	12.60	13.44***	+	13.40	12.70	-
Interaction Facilitation	12.16	12.68**	+	12.60	12.40	-
Goal Emphasis	8.61	8.81	+	8.95	8.45*	-
Work Facilitation	12.14	12.36	+	13.15	12.25*	-
Sign Test[a], two-tail			p<.05			p<.01

Notes:

* p <.10, one-tail.
** p <.05, one-tail
*** p <.01, one-tail.

[a]The sign test is used to establish that two conditions are different and it does not make assumptions about sample or group distributions (Siegel, 1956).

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